

Remarks

Office Action dated May 24, 2004, objects to the Specification and drawings, objects to claim 2, and rejects all pending claims under 35 USC §112, 2nd paragraph and 35 USC §102. In response, claims 1, 2, 4-7, and 20 are amended for clarity, claims 17-19 and 21 are cancelled, and claim 22 is newly added. Claims 10-16 remain withdrawn. The rejections under 35 USC §102 and 35 USC §103 are traversed.

The drawings are objected to because reference numerals 501 and 502 are found in the drawings and are not mentioned in the Description. Applicant brings attention to page 12, line 20, "by removing a perimetrical portion 501", and page 13, line 1, "reference layer access lines 502 electrically connect". It is believed that these references to reference numerals 501 and 502 are sufficient for inclusion in the drawings. Accordingly, no amendments are made in response to this objection of the drawings.

The drawings are also objected to because they do not show every feature claimed. In response, new FIGURE 10 is added, which is a detail view of a portion of FIGURE 5 of the drawings in which a reduced stub trace width relative to the signal trace width is shown. No new matter is added

because the information concerning reduction of the stub trace width is contained in the description page 12, lines 3-20 as originally filed. See MPEP 2163.06. A complete set replacement drawings is included as an attachment to correct for sheet numbering that has changed as a result of the newly added Figure 10.

Claim 1 is rejected under 35 USC §112, 2nd paragraph as being vague and indefinite "since it is not clear from the claim how the stub trace is on the first side when the signal trace is on the first side and the stub trace is in the via". In response, claim 1 is amended to clarify that both the stub trace 103 and signal trace 101 are disposed on the same layer of a layered structure. See FIGURE 5 and p. 5, lines 1-8 of the Specification. A via 102 is electrically connected to both the stub trace and the signal trace. Accordingly, both the stub and signal traces are recited in claim 1 to be "disposed on a first side of an electrically insulating layer". Claim 1, as amended, is believed to be definite.

Claim 1 is also rejected under 35 USC §102 as anticipated by US Pat. No. 6,521,845 B1 to Barrow (herein "the Barrow patent"). In order to properly anticipate a claim, the cited reference must show

all elements and limitations recited in the claim. The Barrow patent is directed to thermal spreading enhancements accomplished by one or more conductive planes, accessed through one or more vias, that provide a large area over which heat generated in the IC may be dissipated. See col. 3, lines 14-22. The Office Action maintains that the Barrow patent discloses a signal trace 32, a via 50, and a conductive stub trace 56 electrically connected to each other. Element 56 of the Barrow patent, however, is a conductive reference plane and not a stub trace. See col. 2, lines 39-42 and col. 3, lines 10-13. Claim 1 recites a stub trace electrically connected to a signal trace and a via. A stub trace, therefore, is connected to a signal trace and is not connected to a reference plane as disclosed in the Barrow patent. FIGURE 2 of the Barrow patent does not appear to illustrate any stub traces and stub traces are not disclosed in the text. A "stub trace" is a "physical artifact of the electro-plating process" that "electrically connects a signal via to a perimeter of the package". Stub traces are typically unused in operation and exist only because of the electro-plating method by which the signal trace is made. See page 1, lines 6-9 of the Specification. Accordingly, the Barrow patent

does not show all elements claimed and it is respectfully requested that the rejection under 35 USC §102 be withdrawn.

Claim 2 is objected to as informal because the term "insulating" is misspelled. Claim 2 is amended to correct the spelling.

Claims 2 through 9 are rejected as indefinite. In response claim 4 is amended for clarity by moving a descriptive limitation already in the claim, to a more grammatically appropriate location. The amendment clarifies that the "area where said electrically conductive layer is absent" is on a second side of the layered structure and is sufficiently large to increase an impedance of said stub traces". Applicant points out the teachings of page 8, line 1 through page 9, line 11 wherein a portion of the conductive layer (the ground plane) adjacent the stub traces is not plated, as in the prior art, thereby increasing an impedance of the stub trace, but not the signal trace, for lack of a reference plane. Taking away too much of the electrically conductive layer compromises an integrity of the layered structure. Claim 4, therefore, recites a qualitative objective where an amount of conductive layer that is absent on the second side is sufficiently large to effectively

increase a stub trace impedance, but not so much as to warp the layered structure. See page 12, lines 21 through page 13, line 6 of the Specification. Accordingly, it is believed that the qualitative limitation is sufficiently clear to one of ordinary skill in the art and withdrawal of the rejection is respectfully requested.

Claims 5 and 6 are rejected as vague and indefinite because it is not clear from the claims what the minimum width is. Claims 5 and 6 are amended to clarify that because the stub trace is an artifact of an electro-plating manufacturing process, the stub trace must be at least as wide as necessary to provide enough conductivity "to support" the electro-plating process. An impedance of the stub trace may be maximized by removing it altogether to achieve an infinite resistance. To do so would prevent the use of the electro-plating process. The minimum width of the stub trace, therefore, is defined by the process by which it is made. That process is known and may change as the electroplating technology evolves. Claims 5 and 6, as amended, are therefore believed to be sufficiently clear to one of ordinary skill in the art of electro-plating to be definite, but sufficiently broad to cover later developed

electroplating processes.

Claim 7 is also rejected as indefinite and is amended in a way similar to claims 5 and 6. The reference plane is also created with the electroplating process. Accordingly, some number of electrical contacts to the reference plane is required. The number of electrical contacts "to support" the electro-plating process is defined by a width of the electrical contacts and the amount of conductivity required of the process. Accordingly, it is not recommended that all of the reference plane be absent from a perimetrical portion of the layered structure because it would not support the manufacturing process. Some number of contacts is taught. One of ordinary skill in the art would be able to determine a number of electrical contacts necessary to support creation of the reference plane using the electro-plating process if the size of the electrical contact is known. Therefore, it is believed that claim 7, as amended, is sufficiently clear to one of ordinary skill in the art.

Claims 2-9 are also rejected as anticipated by the Barrow patent. The rejection is traversed. Claims 2-9 depend from claim 1 or an intermediate depending claim and are believed to be patentable for at least the same reasons claim 1 is believed to

be patentable over the Barrow patent and allowance is solicited.

Claims 10-16 remain withdrawn in response to the restriction requirement.

Claims 17-19 and 21 are rejected. Claims 17-19 and 21 are cancelled.

Claim 20 is rejected under 35 USC §103 as obvious in view of the Barrow patent. Claim 20 depended from claim 17 and, because claim 17 is cancelled, is amended to put it in independent form. The Office Action maintains that the Barrow reference teaches an insulating perimetrical portion of the electrically conductive layer 58. The Barrow patent does not teach a signal trace and a stub trace electrically connected to a via as claimed. It is not clear where the Barrow patent discloses an insulating perimetrical portion. It is further not shown in the Barrow patent, that the perimetrical portion is defined by a position of the stub trace. The relationship of the signal trace to the stub trace and via are claimed and is not found in the Barrow patent. A relationship between the perimetrical portion and stub trace is also found in the claim. Figure 2 of the Barrow patent shows a small portion of the perimeter of a printed circuit board, but does not teach or suggest a relationship

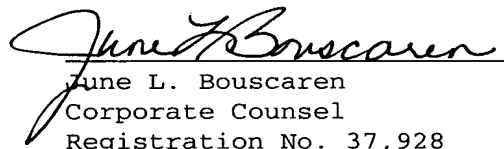
between the perimeter of the PCB and a stub trace. The adaptations required to arrive at the invention of claim 20 with benefit of that which is disclosed in the Barrow patent would not occur to one of ordinary skill in art without the additional benefit of the present disclosure. Accordingly, the Barrow reference cannot render claim 20, as amended, obvious and withdrawal of the rejection is respectfully requested.

Claim 22 is newly added. Examination is respectfully requested.

If any clarifications can be made by way of telephonic interview, the Examiner is invited to contact the Undersigned.

Respectfully submitted,

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Amendments to the Drawings:

New FIGURE 10 is added to the drawings. An entire set of replacement drawings is attached hereto to correct for page numbering that has changed as a result of newly added Figure 10.